Meeting Summary
ETV Wet Weather Flow Technologies (WWF) Pilot
Technology Panel on High Rate Disinfection
February 24, 2000
Mahwah, NJ

A meeting was held February 24, 2000 at HydroQual's offices in Mahwah, NJ to discuss the status of the protocols being written under the NSF Wet Weather ETV Pilot for High Rate Disinfection. In attendance were:

Karl Scheible*	HydroQual
Joy McGrath	HydroQual
John Schenk	NSF International
Richard Field	U.S. EPA
Mary Stinson	U.S. EPA
Isabela Wojtenko	U.S. EPA
Kenneth Smith*	CDM
Gregory Kuchy*	SD Decatur
Gary Van Stone	Calgon
James Bolton	International UV Association
John LaGorga*	Moffa and Associates
Birgit Laumen	Wedeco Ideal Horizons
Paul Albertazzi	Wedeco Ideal Horizons
Sidney Ellner	Ultra Tech Systems
William Cairns	Trojan Technologies (by phone)

* Members or representatives of the Technology Panel

(1) John Schenk opened the meeting with a review of the ETV and the work that has been done on the High Rate Disinfection section to date.

(2) The intent is to receive all comments from reviewers and to have the final version of the UV protocol before the WEF Specialty Conference in New Orleans, the week of March 13.

(3) Mr. LaGorgua, representing Moffa and Associates, presented the final draft of the Mixing protocol: "Generic Verification Protocol for Induction Mixers Used for High-Rate Disinfection of Wet Weather Flows" Version 3.2. Other than written comments that had been received from the EPA, which were handled in the new version or given a response, there was no additional discussion. The Technology Panel members gave an informal approval, which will be formally voted on through ballots provided by the NSF in March, at which point it will be submitted to the SAG.

(4) The remainder of the day was given to discussion of the UV protocol. This was done section by section. The following presents specific comments on the protocol itself.

Test Element 1: Dose Delivery Verification

2.1 Dose-Response Calibration

a. The sample in the petri dish must be well mixed, at least for thirty seconds prior to exposure, and during exposure.

b. Consider taking reflectance into account when estimating the delivered dose. This was stated as 2 to 2.5 percent by Dr. Bolton.

c. There was some discussion of the matrix for conducting the collimated beam assays. The protocol calls for using the same water supply that is used for the full-scale assays. This was accepted, but there should be some direct comparison of the phage from lab to lab. This can be done by running D-R work in a buffered distilled water matrix. This was not incorporated into the protocol.

2.2 UV Test Unit Specifications

a. The flow conditions that are run for the test unit should be representative of the rated operating flow for the system, as provided by the Manufacturer.

b. The hydraulic scalability of the test unit was discussed. The group strongly encouraged documentation by the manufacturer and review and approval by NSF before the test plan is accepted.

c. The requirement for lamp output confirmation by direct testing will be eliminated.

2.4 Dose-Flow Assay

a. There was discussion of a control. This was considered the "influent" sample taken from the batch tank. Sampling the effluent without the lamps on can also impose a control. It was decided that the samples taken at the final effluent should be taken without the lamps on under at least one or two flow conditions as a QC check. But within the protocol of the dose-flow assay, the sampling would be limited to influents taken directly from the batch tank.

b. Sodium thiosulfate and coffee, used for adjusting the batch water, should be confirmed to have no effect on the phage. This should be incorporated into the protocol.

c. The protocol should state directly that distilled water is used as a reference for the transmittance analysis and that quartz cuvettes are used.

d. Both medium pressure and low-pressure lamps should be burned in for a period of 200 hours as part of the test program. The manufacturer should supply new, unburned lamps to the test. Although this step is not considered necessary in the case of the medium pressure lamps, it was decided that all lamps would undergo the burn-in in order to maintain consistency in the protocol.

e. There was discussion of the operating output for the lamps during the assay tests. The protocol called for doing this at 100 percent of the lamps nominal output. Normally, such tests have been run at a level simulating their end-of-life output. This can be 60 to 70 percent for low-pressure lamps and 80 percent for medium pressure lamps. Running at full output, however, may mask the impact of lamp spacing at the low transmittances. We decided to return to the conventional way of running at a reduced output. This was set at 75 percent, regardless of the type of lamp. The manufacturer would have to present how it intended to reach this level during

testing, and how it would not compromise conformity with the commercial system. The reduction would be quantified via a detector positioned at the lamp. The lamp adjustment would have to reduce the intensity to 75% of the intensity at the lamp's full operating condition.

f. The protocols call for having the cleaning device in operation during the sampling. There was some discussion that this could introduce a variable, such that the results could be affected by the timing of the sampling during a cleaning cycle, or the position of the wiper. It was decided that the protocol should call for the wiper to be operated before the start of a sampling sequence, then turned off with the device in its normal "rest" position during the actual sampling.

2.5 Data Compilation and Analysis

a. Eliminate correlation of dose with hydraulic loading normalized to lamp output at 253.7 nm. This would result in a confusing difference between low and medium pressure lamps.

b. The dose should be correlated with hydraulic loading normalized to total input power.

Test Element 2: UV Quartz Cleaning Device Verification

3.1 Test System Specification

a. Use the term "UV sensor" instead of "UV monitoring device"

b. BOD is not necessary as part of the plant's wastewater characterization

c. Add settleable solids and pH to the wastewater characterization

d. Add minimum levels for the parameters describing the wastewater to be used for the test program.

3.2 Fouling/Cleaning Evaluation

a. Can recommend repeating the test at a high flow (in addition to the relatively low flow suggested as the first test condition).

b. The bench-top testing apparatus that is used to measure quartz transparency may be configured differently with different quartz sleeves. The protocol should state that there is flexibility in this, but that the test plan must explicitly describe the apparatus. It should allow for measurement to be taken at different positions along the length of the quartz and around its circumference.

Test Element 3: Performance in a Particle-Bearing Matrix

There was considerable discussion of the merits of Test Element 3 within the mission of the ETV. Element 1 was considered the core verification of the technology, and a procedure that had application across the spectrum of applications, from CSO through drinking water. Test Element 3 was directly applicable to wet weather, but was constrained by the plant characteristics it was tested at. The danger was that this test element would be required at each application. However, including the fractionation and characterization of dose requirement as a function of particle size/distribution would also allow the user to have information that would impact technology selection and decisions regarding pretreatment before disinfection. For example, filtering the water prior to UV exposure may remove larger particles that occlude bacteria. Knowing the levels (retention size) of filtration that directly impact the performance of the UV system would be beneficial. The outcome of this lengthy discussion was that both test

elements should remain in the protocol, at least through the first several verifications. At that point, the protocol can be reviewed and refined, if warranted. It was noted that some prospective technology purchasers may request performance verification in accordance with the Protocol as a minimum, but may chose to require additional on-site testing to supplement the verification report.

4.1 Test Unit Specifications

a. The same unit used for Test Element 1 should be used for Test Element 3. The protocol should reflect this.

4.3 Test Element Protocol

a. The protocol should require both blending and non-blending as part of the dose-response analysis.

(5) There was considerable discussion of the need to unify protocols that are being developed by different agencies. These include the EPA, AWWARF, WERF, NSF, and others. The danger that the manufacturers are facing is the need to do repeated testing for different markets, a costly exercise that will be reflected in the cost of the technology. The notion that 80 percent of the testing can be uniform and constant for all applications was suggested (e.g., the dose response assays at different transmittances). The remaining 20 percent would be more specific to an application (e.g., particle impacts in CSO applications, reliability of meters/controls in water applications, etc.). There were no decisions made in this regard except to agree with the nature of the problem and the need to identify a single party that could bring these conflicting entities together.

(6) The final version of the protocol should conform to the IUPAC standards for nomenclature in Ultraviolet Light. We will do this, possibly leaving "conventional" equivalent terminology in parentheses. These can also be addressed in the glosssary.

(7) Post-Note: We received written comments from Peter Colak of UltraGuard and Jim Bolton of IUVA afterwards. These will be considered in the next version.